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PROGRAMMED INSTRUCTION IN AUDIO-VISUAL EQUIPMENT OPERATION AND APPLICATION.

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IN THE FALL SEMESTER OF 1963 PROGRAMED INSTRUCTION WAS INTRODUCED TO TEACH STUDENT TEACHERS THE OPERATION AND APPLICATION OF AN OVERHEAD PROJECTOR, A TAPE RECORDER, AND FILMSTRIP-SLIDE PROJECTORS. IT WAS DECIDED THAT EACH PIECE OF EQUIPMENT SHOULD BE PROGRAMED INDEPENDENTLY, THAT A LIGHT, INFORMAL APPROACH BE USED, AND THAT, WHILE LEARNING, THE STUDENTS BE BROUGHT IN CONTACT WITH RELATED INSTRUCTIONAL MATERIALS. THE PROCEDURE, ADMINISTERED BY THE STUDENTS, WAS THE SAME FOR ALL TYPES OF EQUIPMENT, AND CONSISTED OF A PROGRAMED BOOKLET PLUS RELATED TRAINING MATERIAL. THE PROGRAMED INSTRUCTION WAS POSITIVELY RECEIVED BY STUDENTS AND TEACHERS. SINCE THE PROJECT WAS BEGUN A GREAT INCREASE IN STUDENT USE OF EQUIPMENT COVERED WAS OBSERVED, THE NEED FOR THE INSTRUCTOR TO BE PRESENT WAS ELIMINATED, AND THE PROGRAM BECAME STANDARD FOR NEW FACULTY. THE CONCLUSIONS ARE THAT AUDIO-VISUAL EQUIPMENT TRAINING CAN BE EFFECTIVELY PROGRAMED, AN INFORMAL APPROACH APPEARS TO HEIGHTEN INTEREST AND REDUCE PREVIOUS BIAS, SHORT, SELF CONTAINED PROGRAMS INCREASE UTILIZATION AND FLEXIBILITY, AND CLASS ROOM APPLICATION CAN BE DEMONSTRATED BY USE OF SAMPLE MATERIALS. SAMPLE PAGES OF PROGRAMS ARE SHOWN IN THE APPENDIX. (OH)

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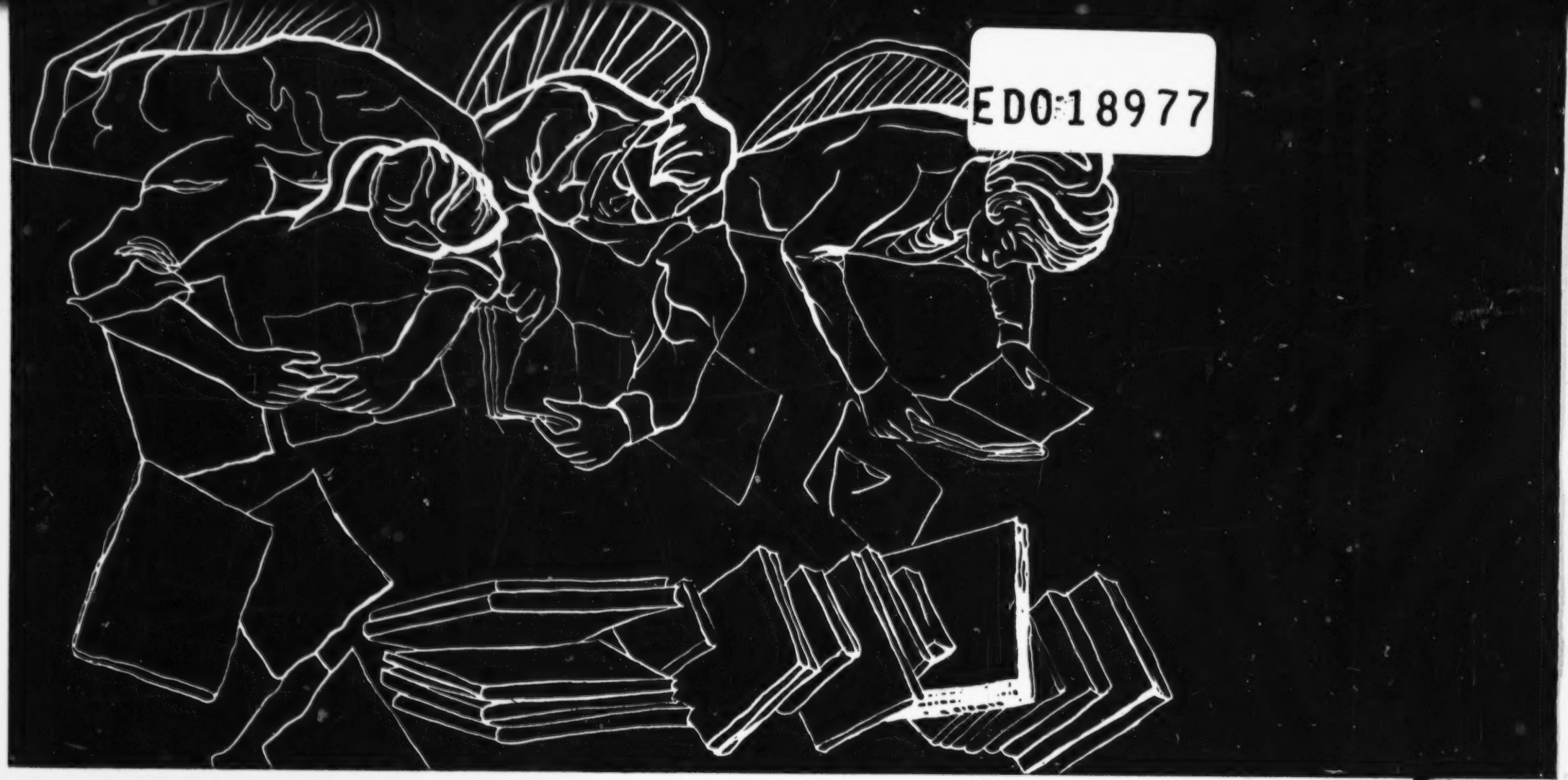

OFFICE FOR THE STUDY OF INSTRUCTION ● UNIVERSITY OF MIAMI ● CORAL GABLES, FLORIDA

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U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
OFFICE OF EDUCATION

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PROGRAMMED INSTRUCTION IN AUDIO-VISUAL EQUIPMENT OPERATION AND APPLICATION

The Problem

At the University of Miami, all students within the School of Education are required to have experience in the operation of the basic pieces of audio-visual equipment and an understanding of the potential applications of the use of instructional resources within their field of study. Florida, like many states, does not have an audio-visual requirement within the state teaching credential and, therefore, this portion of the curriculum is covered within the course scheduled immediately prior to the internship sequence. In the past, the operation of basic pieces of equipment--slides, filmstrip, overhead, and 16mm motion picture projectors--was combined with applications in a series of formal lectures and related laboratory work. With as many as 300 students registered in this sequence at one time, it has been apparent for some time that this approach has been over-consuming of both faculty and student time. It was also felt that new tools and techniques permitted the use of new procedures and greater student involvement.

The Approach

In the fall semester of 1963, a decision was made by the two instructors responsible for this course to explore, with the Office for the Study of Instruction, the possible application of programmed instruction to the operation and application of selected equipment. Several fundamental decisions were made:

1. Each piece of equipment would be programmed independently to allow for maximum flexibility of student scheduling. It soon became apparent that these programs could also be used to train university faculty in equipment operation.[1]
2. A light informal approach would be used. With many of the students, particularly the girls, being somewhat hesitant about the manual aspects of machine operation, it was felt that this approach might help lessen any preconceived negative attitudes.
3. While learning to operate the pieces of equipment, the student would, wherever possible, be brought in contact with a wide variety of related instructional materials. In effect, he would learn the uses of the machine at the same time he was learning its operation.
4. Each programmed sequence would be independent and utilize, when possible, the materials normally used with that particular piece of equipment.

The Overhead Projector

The first machine to be programmed was the overhead projector. This machine was selected for two basic reasons: first, the overhead projector is one of the easiest machines to operate and thus

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[1]Three programs were developed for this project, "The Overhead Projector" by Robert M. Diamond, "The Wollensak Tape Recorder" by Harry Hall and Robert M. Diamond, and "The Graflex & Bell & Howell Slide-Filmstrip Projectors" by Sidney Besvinick and Robert M. Diamond.

program, and second, there are very few differences between the basic operation of most models.

The program itself, predominently linear in format, consisted of a programmed booklet of 19 pages and three envelopes each containing one or more overhead transparencies and a direction sheet, again written in the linear format. The instruction booklet covered machine operation while the sequence in the envelopes included the use of transparencies from their simplest to their most complex forms. The transparencies themselves illustrated a wide range of design techniques and applications and were selected from numerous subject areas. Sample pages from the instruction booklet and one of the envelope direction sheets will be found in Appendix A.

The program was first tested on a group of 20 students plus faculty and was then revised.

Procedure

Four overhead projectors from two manufacturers and sets of programmed materials were made available. Students signed up for half-hour periods and at the completion of the programmed sequence responded to a questionnaire. During the Spring semester, 235 students went through the program at an average time of slightly over 15 minutes each. A student assistant was available to answer any questions. Results of the questionnaire were as follows:

Table 1

I feel that this experience was:

	N	%
a. extremely interesting	109	46
b. interesting	115	49
c. of some interest	7	3
d. of little interest	2	1
e. boring	2	1
no answer	0	0

Table 2

I feel that the material was paced:

	N	%
a. too fast	2	1
b. a little fast	14	6
c. just right	183	78
d. a little slow	25	11
e. too slow	6	2
no answer	5	2

Table 3

I feel that I learned:

	N	%
a. a great deal	128	55
b. some	95	40
c. not very much	5	2
d. very little	4	2
no answer	3	1

Table 4

I (do) (do not) see applications for the overhead projector within my teaching.

	N	%
a. do	222	94
b. do not	0	0
no answer	13	6

Table 5

I would rate this approach to teaching the operation of the overhead projector:

	N	%
a. excellent	139	59
b. good	77	33
c. fair	12	5
d. poor	2	1
e. very poor	1	0
no answer	4	2

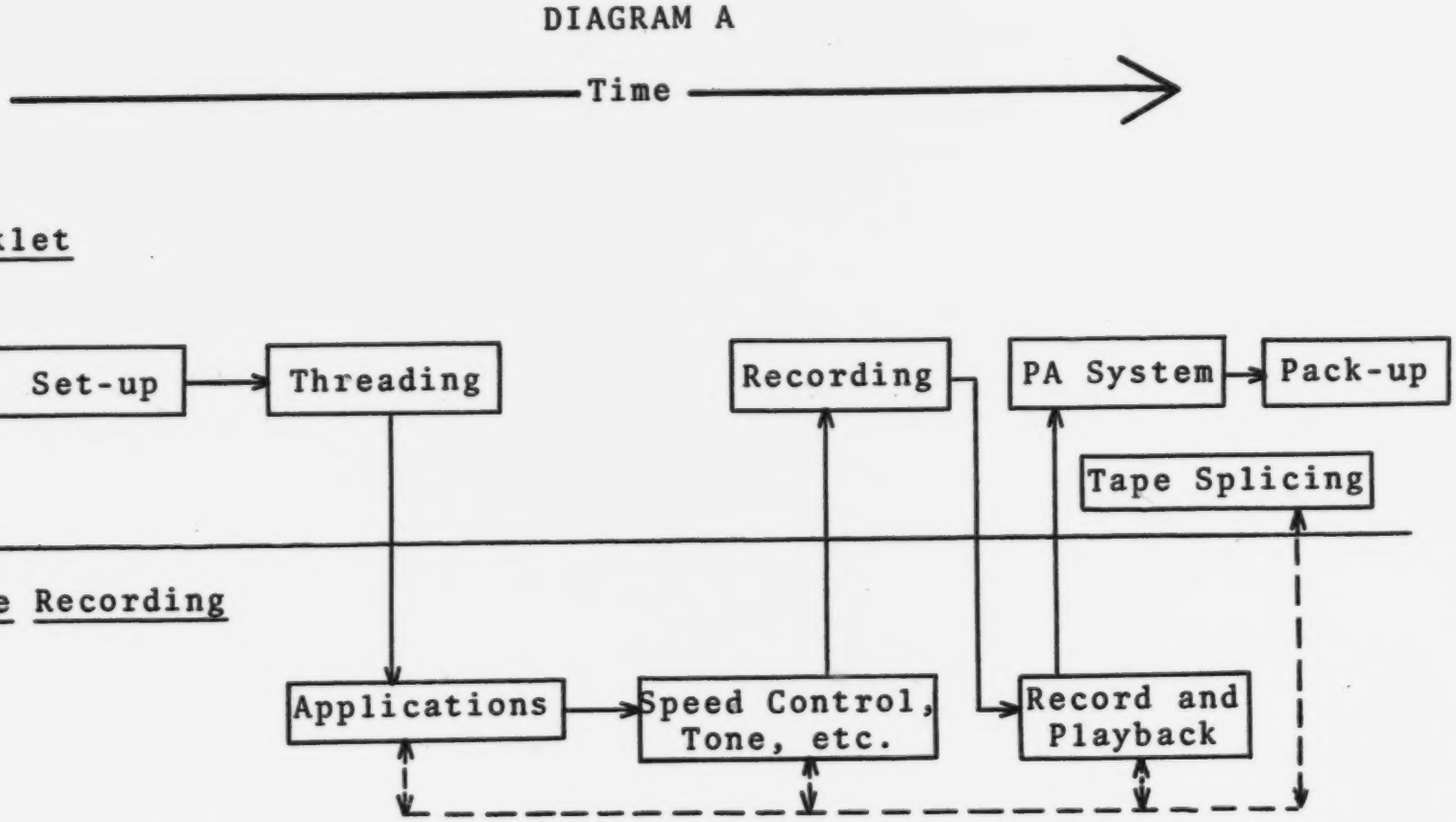
When given the opportunity to comment, 37 of the students (16%) mentioned favorably, in one form or another, the light humorous approach that was taken. One felt that the technique was childish and should not be used with college students. There were 14 (6%) comments on the effectiveness of the programmed format and 9 (4%) requested that information on the making of transparencies also be included.

The Tape Recorder

While a single program could and did serve in teaching the operation of the overhead projector, it was apparent from the beginning that the wide variety in design and operation of other audio-visual equipment necessitated a specific program for each piece of equipment. In the area of tape recorders the instructors were fortunate as a decision had been made previously that only the Wollensak tape recorder would be utilized in the course. A programmed sequence was designed in the Spring of 1964 covering the operation and application of this particular machine.

This program, much like that used with the overhead, had two parts--a programmed booklet and, in this case, a tape recording. The 29 page booklet covered set-up and loading, recording, utilizing the recorder as a PA system and splicing. Use of the recorder in the classroom and many of the operating skills were included on the tape itself. During the first use of the programmed sequence students frequently went from booklet to tape and back to the booklet. In the final format, the number of shifts has been reduced to provide improved effectiveness and to eliminate confusion. A diagram of the final program sequence will be found in Diagram A.

DIAGRAM A



An experimental group of 35 students received their instruction through this technique in the Spring semester 1965. Average time required--45 minutes.

At the completion of the sequence, students were given a list of terminal objectives and asked to indicate to which degree of success they felt they could meet the stated objectives. Results were as follows:

Table 6

Set up the recorder

	N	%
can do	32	91
need work	1	3
borderline	2	6
cannot do	0	0
no answer	0	0

Table 7

Use PA System

	N	%
can do	6	17
need work	22	63
borderline	3	9
cannot do	3	9
no answer	1	2

Table 8

Make Recording

	N	%
can do	21	60
need work	13	37
borderline	0	0
cannot do	0	0
no answer	1	3

Table 9

Prepare the recorder for storage

	N	%
can do	31	89
need work	4	11
borderline	0	0
cannot do	0	0
no answer	0	0

Table 10

Know the function of the operating parts

	N	%
can do	16	46
need work	13	37
borderline	4	11
cannot do	1	3
no answer	1	3

During the experimental period it was found that students tended to record over some of the pre-recorded instructions. This problem was eliminated by moving the instructions that followed the taping further back on the tape leaving enough recording room to prevent overlap. Several other modifications were made at this time to solve the few additional minor problems that were present.

Filmstrip-Slide Projectors

The third area programmed as part of this project was the filmstrip-slide projector. Within this course two projectors had been used, the Graflex and the Bell and Howell. Rather than developing a separate program for each machine, a decision was

made to combine the two in a branching sequence. The program in its final stage included 68 frames almost equally divided among combined instructions for both machines and the two independent sequences. The time required for students to complete the sequence which included projecting both filmstrips and slides was approximately 45 minutes.

Further modifications in the program have been indicated. For example, on one of the machines the sequence dealing with the insertion of the slide carriage has not been clearly presented.

Discussion

The use of programmed sequences to teach machine and application has been positively received by both students and faculty. As with most programmed materials, the time required for writing and revision was extensive, averaging a minimum of 30 hours per sequence. There was approximately a fifty-to-one ratio between the time spent by the staff in the development of the sequence and the time a student spent with it. During the developmental period, programs were continually being modified as field tests indicated specific problems. Time required between the first and final drafts was a minimum of six months.

Indicative of the success of the programs has been the great increase in student projects in their courses and teaching utilizing the pieces of equipment covered. Since this project was begun, the number of student presentations and reports using overhead transparencies, tapes, slides, and filmstrips has increased

substantially in almost every education course that followed. Many students have used the facilities and staff of the Office for the Study of Instruction in the development of their own materials for use with these machines.

Administratively, this technique has eliminated the need for an instructor to be present during the machine operation phase. It has allowed those lectures that were assigned to the instructional resource area to be used for introduction to some of the newer developments in the field, such as television, programmed instruction, etc. reducing the emphasis on the handling of basic audio-visual equipment. Under the present system, over 200 students can go through all the programs in two weeks. The average time required for each student is less than 1 1/2 hours. Four overhead projectors, 4 tape recorders, and 2 slide-filmstrip projectors are required.

This approach has also proved extremely effective for use with individual faculty members and the use of the programs is now standard with new faculty wishing to be "checked out" on a particular machine for the first time.

Conclusions

1. Audio-visual equipment operation and application for both faculty and students can be effectively programmed.
2. An informal approach within the program appears to highten student interest and reduce problem resulting from previous bias.
3. A short self-contained programmed sequence for each machine permits increased utilization and flexibility of scheduling.

4. Classroom application of the equipment can be effectively demonstrated by utilizing sample materials within the programmed sequence.

APPENDIX A

Sample pages from The Overhead Projector,
a programmed sequence by Robert M. Diamond

Congratulations!

You are about to operate one of the newest and most practical teaching tools,

THE OVERHEAD PROJECTOR

-1-

What makes this projector so valuable is that it not only is easy to use and extremely portable

but it has several other major advantages.

-2-

A. It has many simple and effective uses in almost every course.

B. It can be used in a lighted room.

C. It is quiet.

C. You operate the projector in front of the room facing the class.

-3-

Now just to see if you're paying attention let me ask you a question and after you've made your selection go to the page indicated.

-4-

The overhead projector:

A. Must be used in a darkened room--go to page 7.

B. Is simple to operate--go to page 8.

C. Makes it necessary for the teacher to face away from the students--go to page 9.

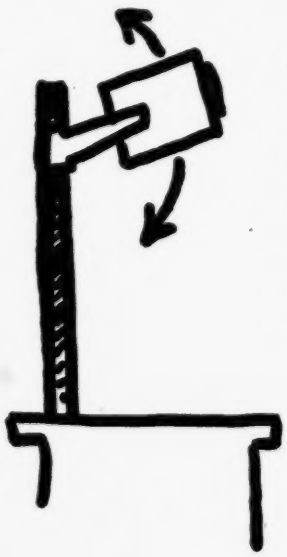
-5-

You said the overhead projector is simple to operate and right you are.

Just to show you that I mean what I say let's go to page 10 and in about five minutes have you operating the machine.

-8-

As far as operation of the overhead goes there are only two simple adjustments to worry about.

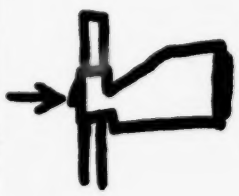


To raise or lower the image on the screen, simply tilt the head or (on larger projectors) the mirror in the head. O.K. Try it.

-16-

Fine. Focusing is also rather simple. Where the head of the machine joins the perpendicular shaft you will find a knob

or a type of squeeze mechanism



or a button that is pushed in to move the head unit up or down.

-17-

(Cover sheet, Envelope C)

In the production of overhead transparencies, each sheet comes out a single color and by using different sheets we can combine colors in an effective presentation.

C1 is made of a sheet of red and a sheet of black. Notice how much more effective this one would be if the red lines were thicker.

C2 and C3 dmonstrate some excellent uses of color. In C3 we have hinged a piece of cardboard with masking tape so that we may uncover the last line when we're ready to use.

C4 to C10 show the use of the overlays where by simple adding or subtracting sheets we can present our lesson step by step. As you go through these transparencies notice that:

A. as mentioned previously, each sheet is only one color

and

B. a complicated visual becomes clear when broken down into its intermediary steps.

Now let's take these one at a time. Look carefully at C4 and you will notice that the top sheet, with the terms, is attached on the left but free on the right. Lift it up and you will be able to project the ear without the names. You may use it this way for testing. This hinged sheet is called an overlay. Transparencies C4 through C8 are designed in this manner. Lift up all the overlays and then add one at a time.

C9 is a different type where instead of adding you uncover one sheet at a time. Try and notice how well this technique works.

Well now you've seen the machine, operated it and, we hope, have begun to realize all that can be done with the overhead projector. Please put the materials back in this envelope, turn the projector off and unplug it.

We hope also that you've enjoyed this experience and we would appreciate your filling in the form provided so we can tell whether or not we have communicated.